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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/057,026	01/24/2002	Chung-Chu Chen	64,600-090	2073

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EXAMINER

BROOKE, MICHAEL S

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 09/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/057,026

Applicant(s)

CHEN ET AL.

Examiner

Michael S. Brooke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ³/₂ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-10, drawn to a method of manufacturing an ink jet print head, classified in class 216, subclass 27.
- II. Claims 11-20, drawn to an ink jet print head, classified in class 347, subclass 48.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the apparatus could be made by a materially different process, such as laser ablation.

2. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

3. This application contains claims directed to the following patentably distinct species of the claimed invention:

Species 1, as shown in Figs. 3A-3F.

Species 2, as shown in Fig. 2

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

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4. During a telephone conversation with Randy Tung on 06/26/02 a provisional election was made without traverse to prosecute the invention of Group 2, species 1, claims 11-20. Affirmation of this election must be made by applicant in replying to this Office action. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

5. The drawings are objected to because reference numerals "26" and "35" are not described in the specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "52" and "50" have both been used to designate the photoresist layer which is identified by Ref. No. "50" in the specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

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7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "52" has been used to designate both an aperture and an ink droplet in Fig. 3E. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

8. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "first and a second insulating material layer of at least 1000 Å thick on said top and bottom surfaces" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

9. The disclosure is objected to because of the following informalities: The specification does not provided a description of reference numerals "26" and "35." Also, the language "[s]imultaneously within a short delay," found on page 22:3, does not make sense.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 11-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 11 and 14:

- These claims are unclear because it merges elements of the intermediate structure shown in Fig. 1L with the final structure shown in Fig. 3F. Claim 11 recites that an insulating layer is formed at the bottom of the substrate. This insulating layer is identified as Ref. No. "18" in Fig. 1L. This layer is removed to arrive at the final structure shown in Fig. 3F. Claim 11 also recites an orifice in the seed layer and an aperture in the orifice plate. The aperture is identified by Ref. No. "52" in Fig. 3F. Fig. 1L does not show this aperture, but instead shows a photoresist layer "50" that is patterned to form the aperture. Thus, claim contains elements that are mutually exclusive to both the intermediate structure of Fig. 1L and the final structure of Fig. 3F. For the purposes of examination, the Examiner will examine the final structure, as shown in Fig. 3F.

Claim 13:

- "said ring-shaped heater" lack antecedent basis.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 11, 12, 14-17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leban (EP 317 171) in view of Mitani et al. (5,831, 648), Taub et al. (5,308,442) and Hawkins et al. (6,214,245).

Leban teaches a monolithic ink jet print head comprising a silicon substrate (32), two spaced apart heaters (42 and 44) made of TaAl (p. 3:43) are formed on the top surface of the substrate. Heater (42) is provided to eject ink and heater (44) is provided to improve refill speed. At least two interconnects are provided, wherein each interconnect is in communication with one of the resistors. An insulation layer (46) is formed on top of the spaced apart heaters. This layer is the same as the claimed third insulating layer. A barrier layer (48), having a thickness of between 100,000 to 750,000 Å (see Table), is made of VACREL or RISTON, both of which are photoimagable materials. The layer (48) is the same as the claimed first photoresistive layer. As can be seen in Fig. 1B, the ink chamber has primary and auxiliary portions, wherein the heater (44) is positioned in the auxiliary portion and the heater (42) is positioned in the primary ink chamber. A nickel orifice plate (56) is provided on the barrier layer (48). Leban is silent as to the shape of the ink feed slot, however, Fig. 5 does show that the ink is feed from below and through the substrate.

Leban teaches the claimed invention with the exception of a first insulating layer made of silicon dioxide and having a thickness of at least 1000 Å, a funnel shaped manifold in the substrate, a metal seed layer on the first photoresistive layer, a nickel layer on top of the metal seed layer, the heater in the primary ink chamber being ring-shaped and the seed layer being either Ni or Cr.

Mitani et al. teaches (Fig. 31) an ink jet print head comprising a silicon substrate (301) and a silicon dioxide insulation layer (317) formed between the substrate and a heater (303). The insulation layer is about 1 to 2 microns thick (10,000 to 20,000 Å) and insulates the substrate from heat generated by the heater (col. 24:21-25).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have provided Leban with a silicon dioxide insulating layer having a thickness of at least 1000 Å for the purpose of insulating the substrate from the heat generated by the heater, as taught by Mitani et al.

Taub et al. teaches an ink jet print head having funnel shaped ink fill slots formed therein. The use of an ink slot having this provides increased flow capacity to adequately respond to ink volume demands (col. 1:56-59).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have provided Leban with a funnel shaped manifold for the purpose of adequately responding to ink volume demands, as taught by Taub et al.

Hawkins et al. teaches a method of forming an orifice plate for an ink jet print head wherein a Ni or Cr seed layer (444) is formed over a substrate and then a plate layer of nickel (446) is deposited over the seed layer, so that the seed layer and the

plate layer form a nozzle plate (445) (col. 8:52-65). The use of the seed layer allows for the production of very small or critically dimensioned nozzle plates which are thin and flexible (col. 8:27-30).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have provided Leban with a metal seed layer on the first photoresistive layer, a nickel layer on top of the metal seed layer, for the purpose of making a nozzle plate that is very small or critically dimensioned and which is thin and flexible, as taught by Hawkins et al.

14. Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leban (EP 317 171) in view of Mitani et al. (5,831, 648), Taub et al. (5,308,442) and Hawkins et al. (6,214,245), as applied to claims 11, 12, 14-17 and 20 above, and further in view of Moon et al. (US 2002/0012027).

Leban, as modified, teaches the claimed invention with the exception of a ring-shaped heater positioned in the primary ink chamber.

Moon et al. teaches (Fig. 5) an inkjet print head having a ring shaped heater (50') that is centered under nozzle (102a). The use of a ring-shaped heater simplifies manufacturing, prevents satellite droplets and prevents cross-talk with adjacent nozzles (p. 2:0037).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have provided Leban with a ring-shaped heater in the primary chamber, for the purposes of simplifying manufacturing, preventing satellite droplets and preventing cross-talk with adjacent nozzles, as taught by Moon et al.

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15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. Brooke whose telephone number is 703-305-0262. The examiner can normally be reached on M-F 5:30-2:00.

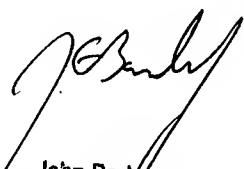
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on 308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-3431 for regular communications and 703-308-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4900.

MD

Michael S. Brooke
Examiner
Art Unit 2853

MSB
September 5, 2002


John Barlow
Supervisory Patent Examiner
Technology Center 2800